

## ABSTRACT OF THE DISCLOSURE

A membrane comprising: (a) a hydrophobic matrix polymer, and (b) a hydrophilic non-ionic polymer, wherein the hydrophobic polymer and the hydrophilic polymer are disposed so as to form a dense selectively proton-conducting membrane. The microstructure of such a membrane can be tailored to specific functionality requirements, such as proton conductivity vs. proton selectivity, and selectivity to particular species.